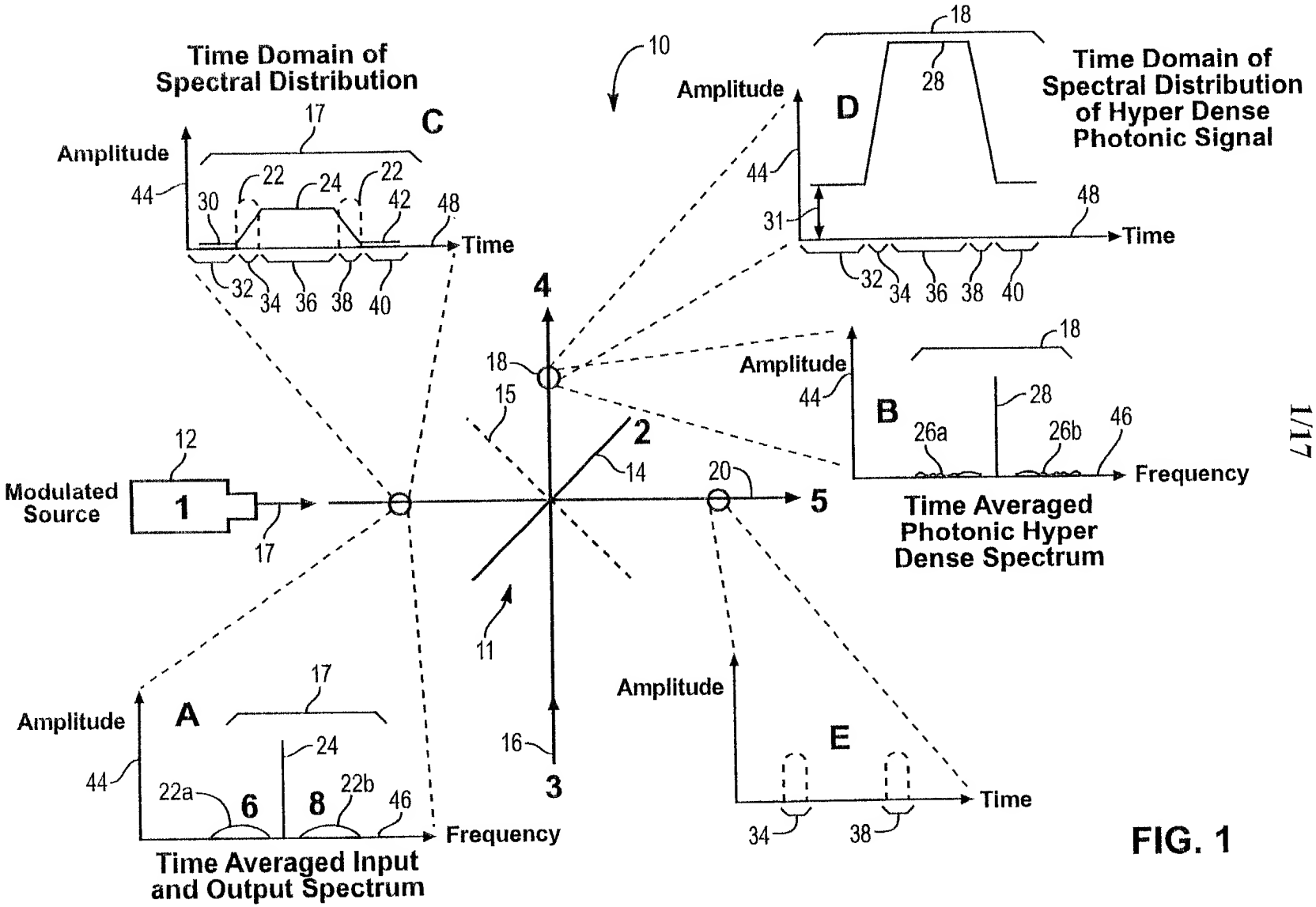

Time Domain of Spectral Distribution
C
Amplitude
Time
17
22
24
22
30
42
48
44
32
34
36
38
40
10
Amplitude
D
18
28
Time Domain of Spectral Distribution of Hyper Dense Photonic Signal
44
31
48
Time
32
34
36
38
40
4
18
15
2
14
20
5
12
Modulated Source
1
17
11
16
3
Amplitude
18
B
28
26a
26b
46
44
Frequency
Time Averaged Photonic Hyper Dense Spectrum
Amplitude
A
17
24
44
22a
6
8
22b
46
Frequency
Time Averaged Input and Output Spectrum
Amplitude
E
Time
34
38

FIG. 1

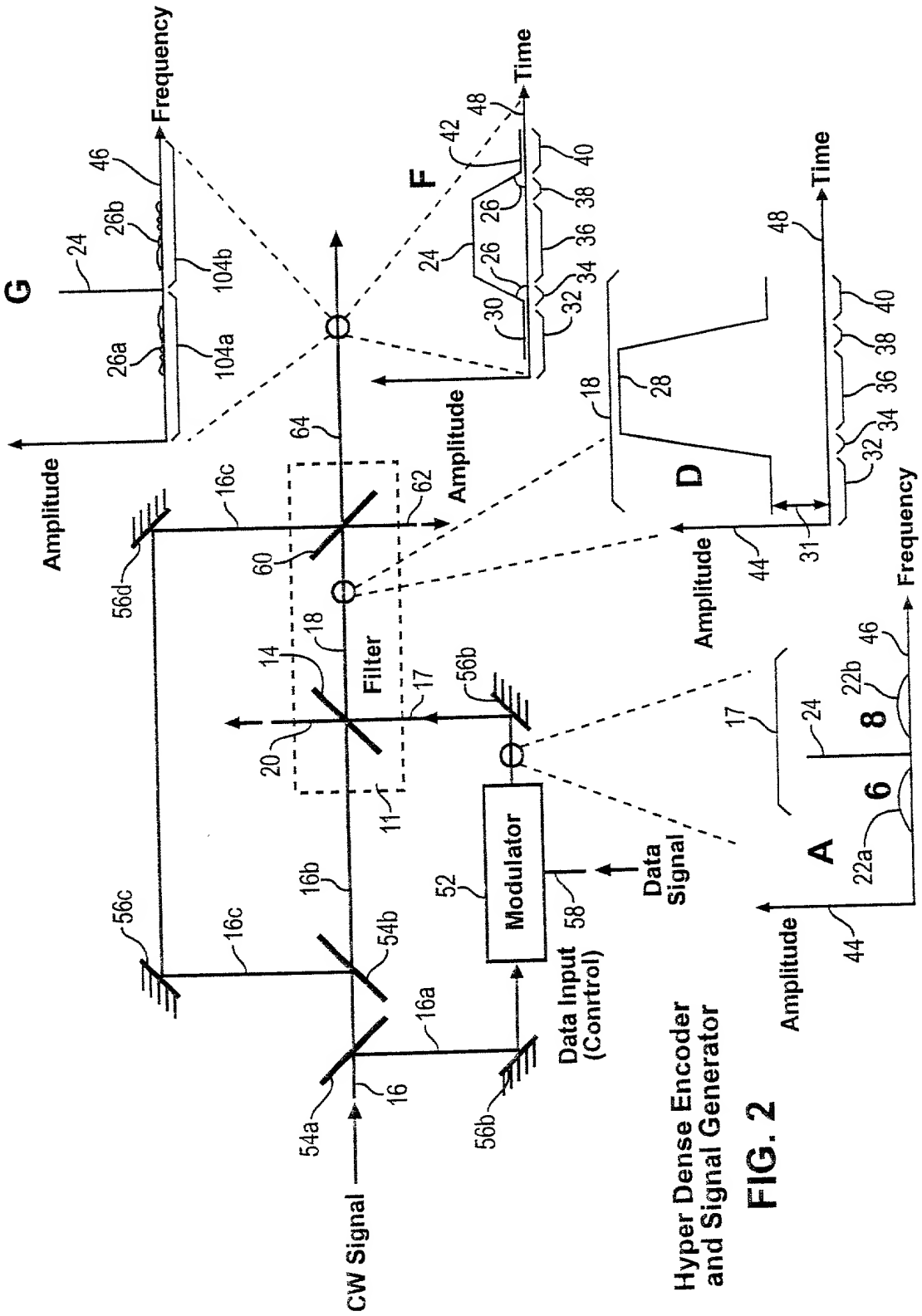

Hyper Dense Encoder and Signal Generator
CW Signal
Data Input (Conrtrol)
Data Signal
Modulator
Filter
Amplitude
Frequency
Time
A
D
F
G

FIG. 2

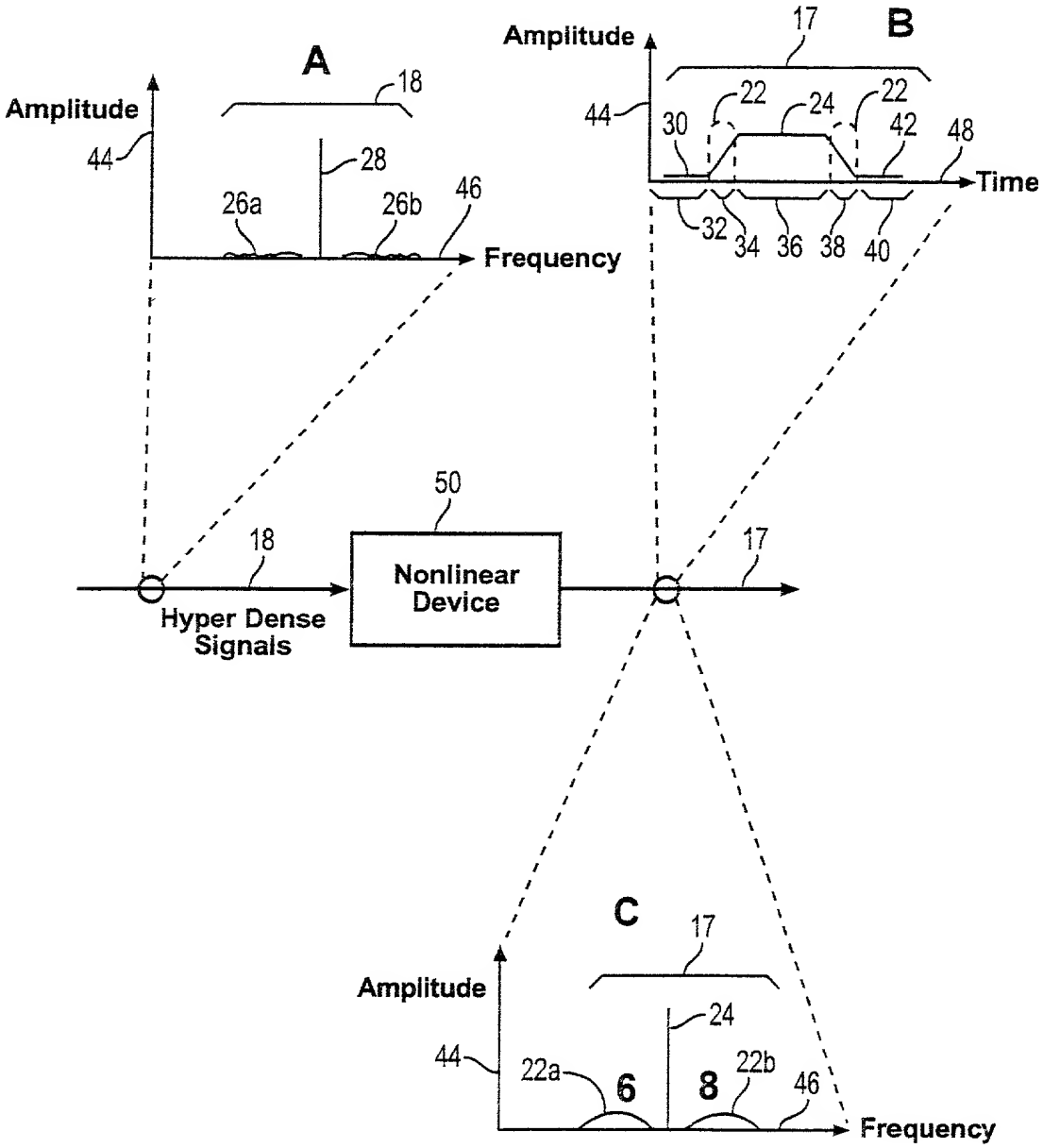

A
Amplitude
18
44
28
26a
26b
46
Frequency
B
Amplitude
17
44
22
24
22
30
42
48
Time
32
34
36
38
40
50
18
Nonlinear Device
17
Hyper Dense Signals
C
17
Amplitude
24
44
22a
6
8
22b
46
Frequency

FIG. 3

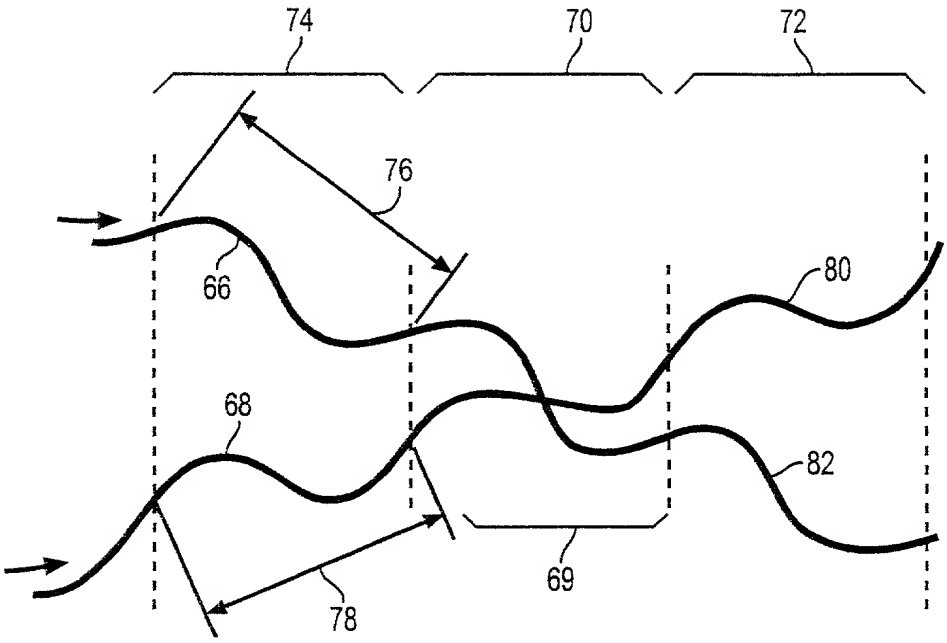


FIG. 4

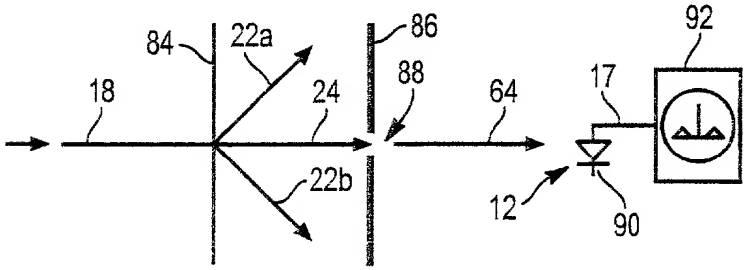


FIG. 5

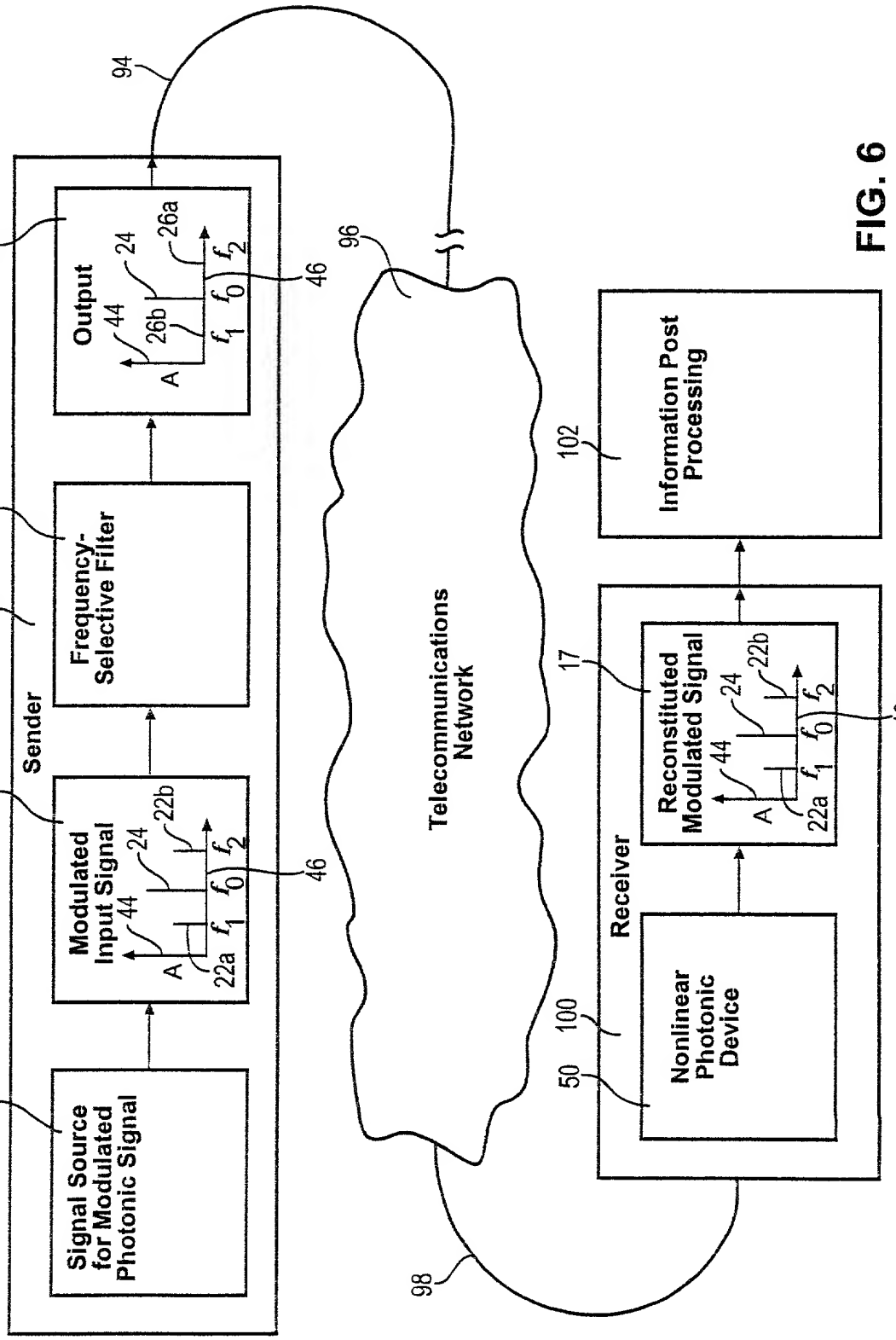
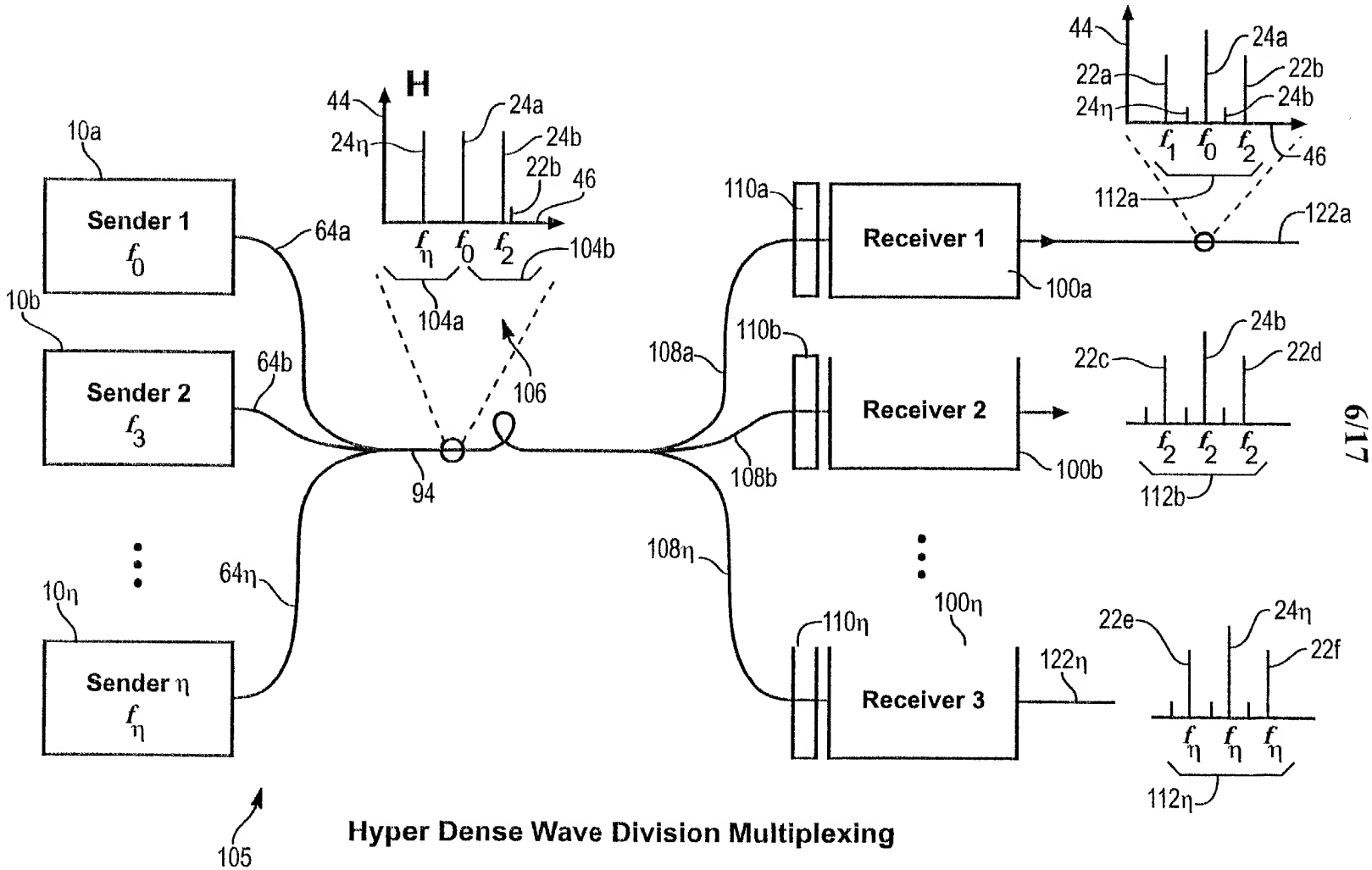

Sender
Signal Source for Modulated Photonic Signal
Modulated Input Signal
Frequency-Selective Filter
Output
Telecommunications Network
Receiver
Nonlinear Photonic Device
Reconstituted Modulated Signal
Information Post Processing
12
17
10
11
64
94
96
98
100
50
102
46
A
44
24
22a
22b
26a
26b
f_1
f_0
f_2

FIG. 6



Hyper Dense Wave Division Multiplexing

FIG. 7

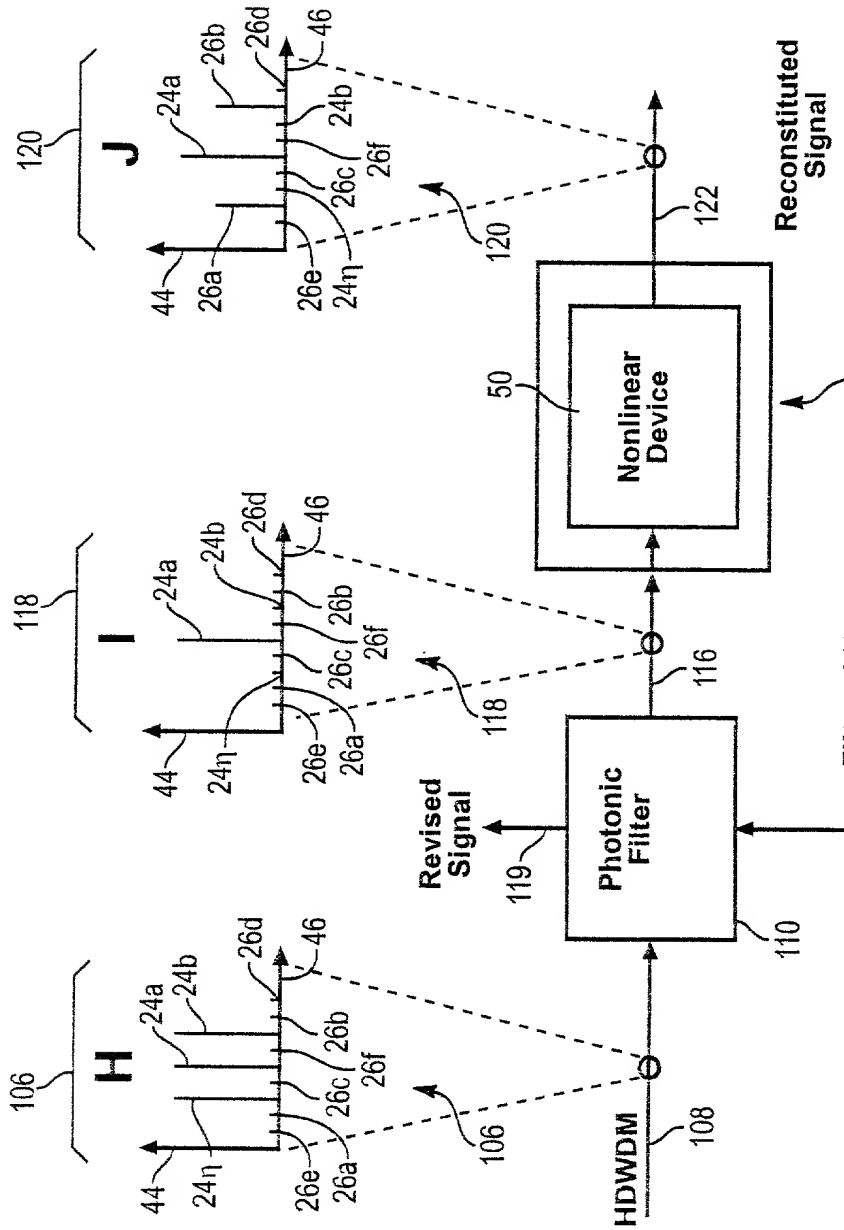

106
H
24a
24b
26d
46
26b
26c
26f
44
24η
26e
26a
106
HDWDM
108
Photonic Filter
110
Revised Signal
119
118
I
116
Nonlinear Device
50
100
Filtered Hyper Dense Photonic Signal
114
Narrowband Reference
120
J
122
Reconstituted Signal

FIG. 8

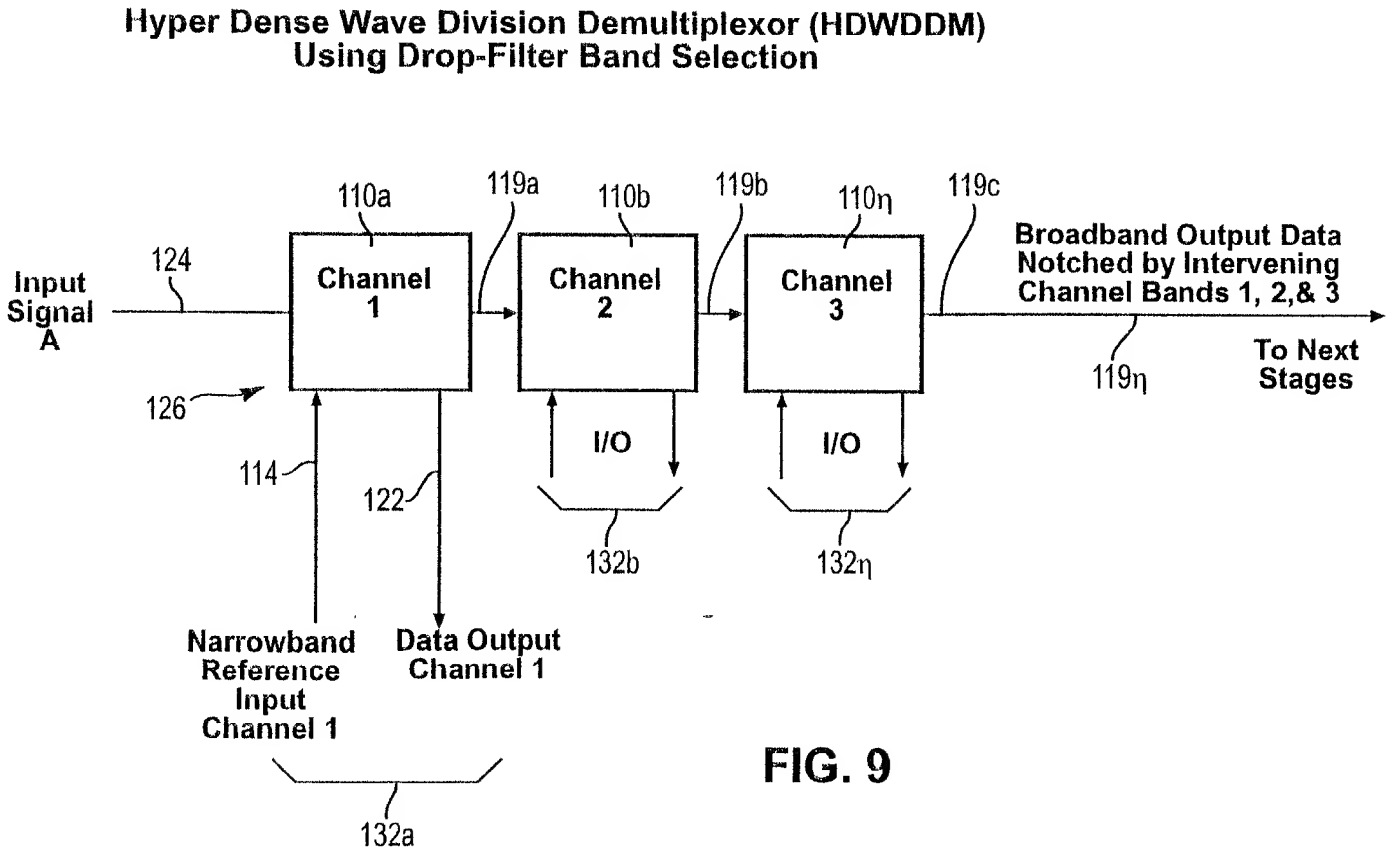

Hyper Dense Wave Division Demultiplexor (HDWDDM)
Using Drop-Filter Band Selection
110a
119a
110b
119b
110η
119c
124
Input Signal A
Channel 1
Channel 2
Channel 3
Broadband Output Data Notched by Intervening Channel Bands 1, 2,& 3
To Next Stages
119η
126
114
122
I/O
I/O
132b
132η
Narrowband Reference Input Channel 1
Data Output Channel 1
132a

FIG. 9

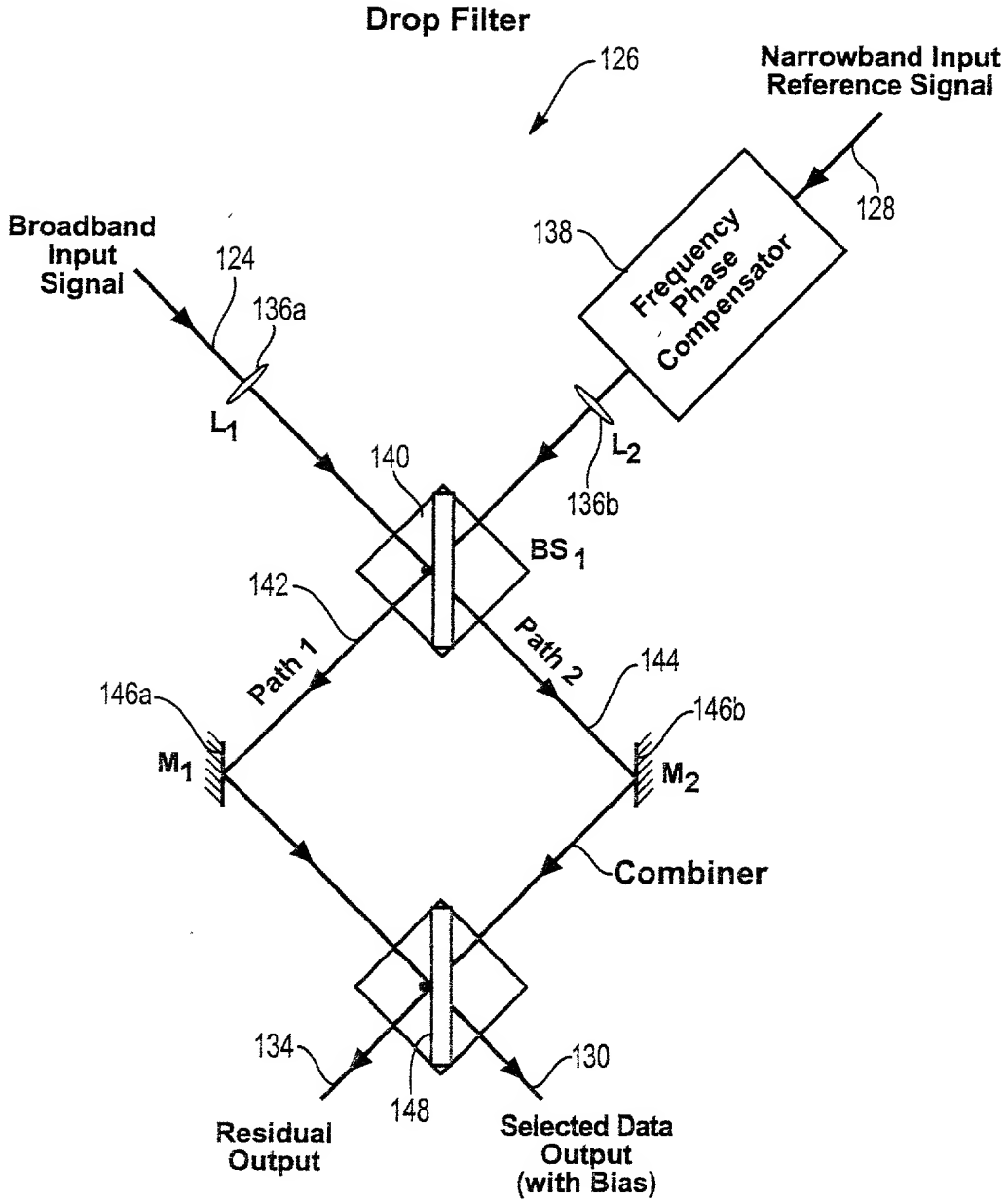

Drop Filter
126
Narrowband Input Reference Signal
128
Broadband Input Signal
124
136a
138
Frequency Phase Compensator
L_1
L_2
136b
140
BS_1
142
Path 1
Path 2
144
146a
146b
M_1
M_2
Combiner
134
130
148
Residual Output
Selected Data Output (with Bias)

FIG. 10

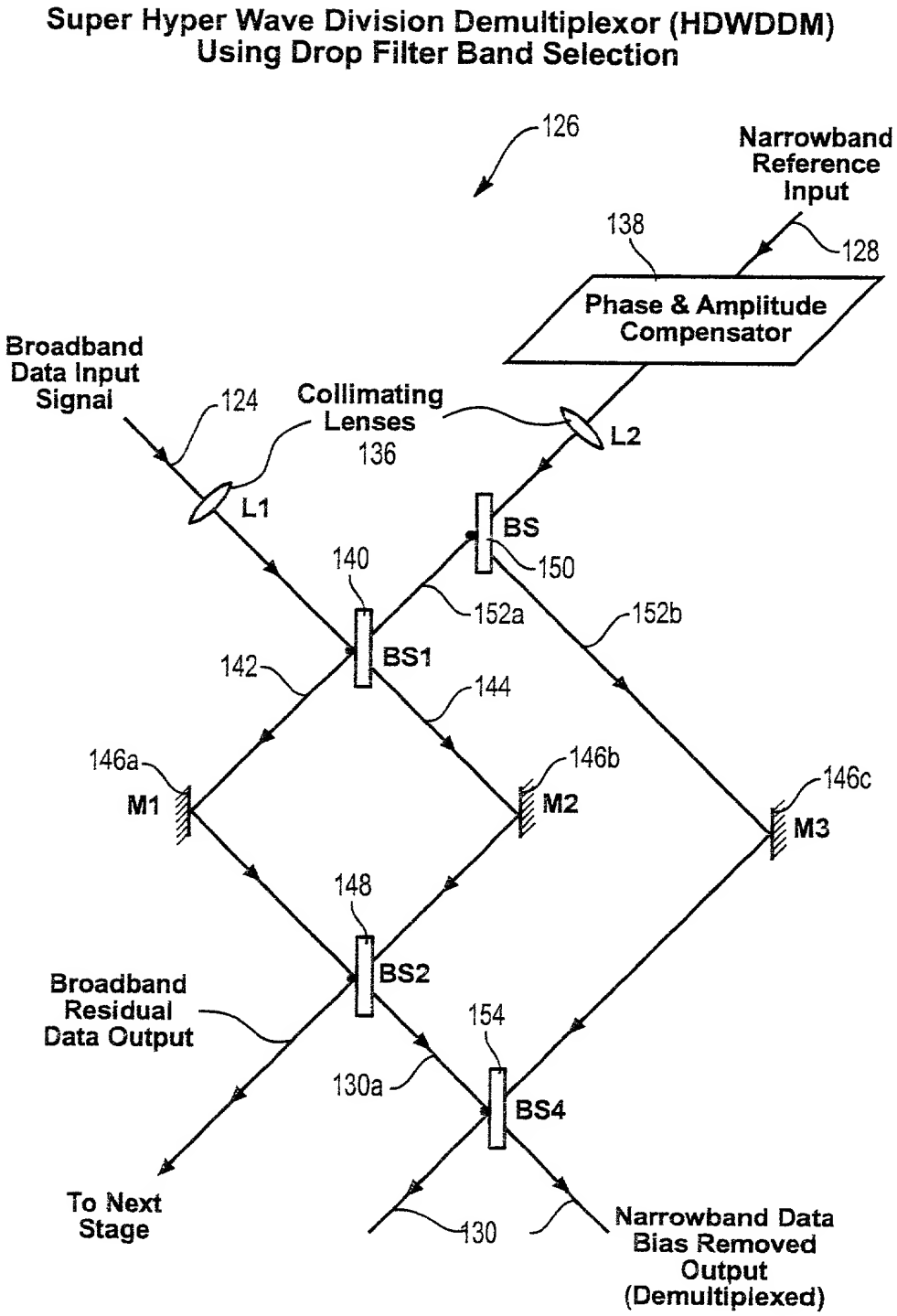
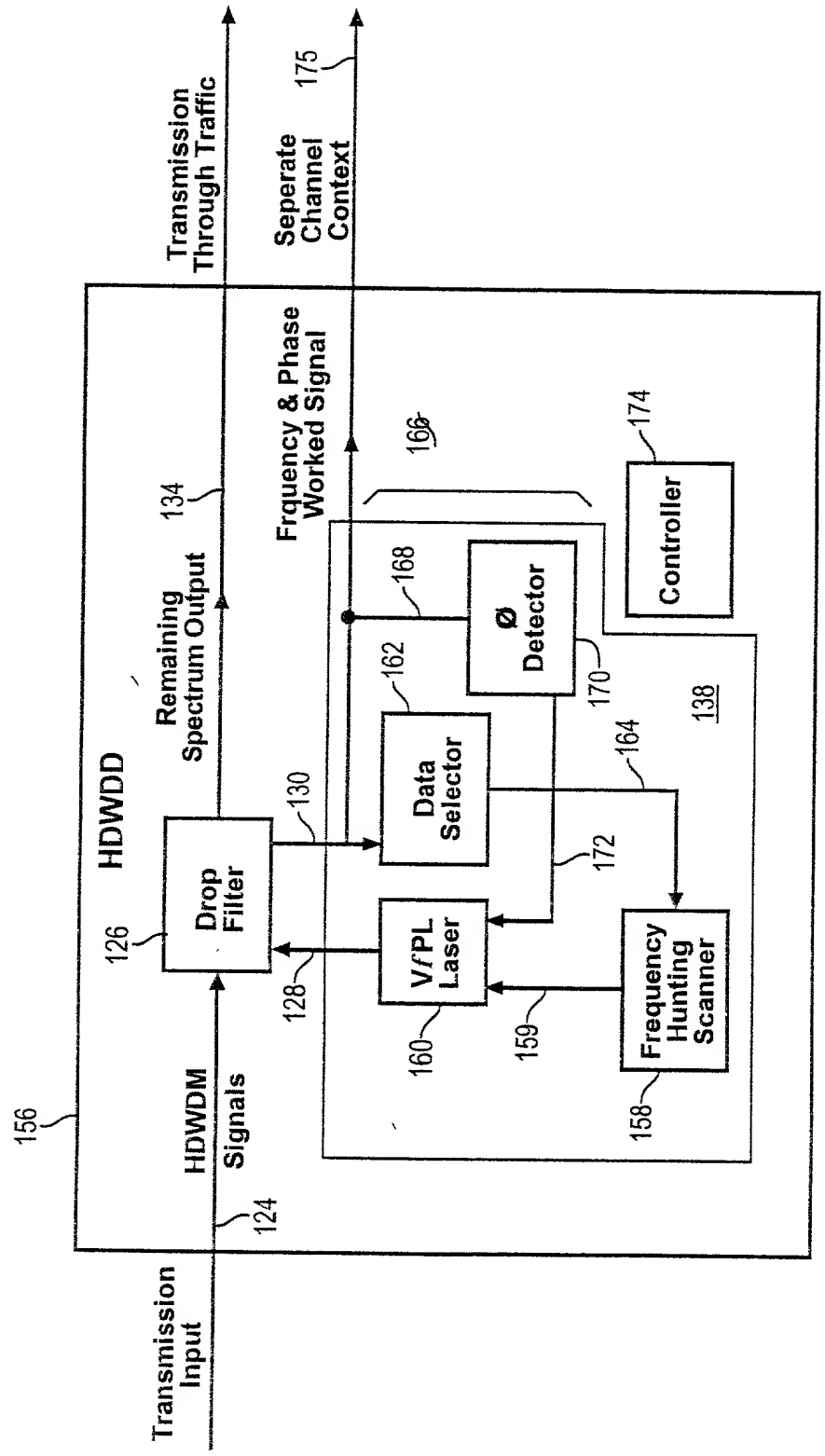

Super Hyper Wave Division Demultiplexor (HDWDDM)
Using Drop Filter Band Selection
126
Narrowband
Reference
Input
138
128
Phase & Amplitude
Compensator
Broadband
Data Input
Signal
124
Collimating
Lenses
136
L2
L1
BS
140
150
152a
152b
BS1
142
144
146a
146b
146c
M1
M2
M3
148
BS2
Broadband
Residual
Data Output
154
130a
BS4
To Next
Stage
130
Narrowband Data
Bias Removed
Output
(Demultiplexed)

FIG. 11



Hyper Dense Channel Separator

FIG. 12

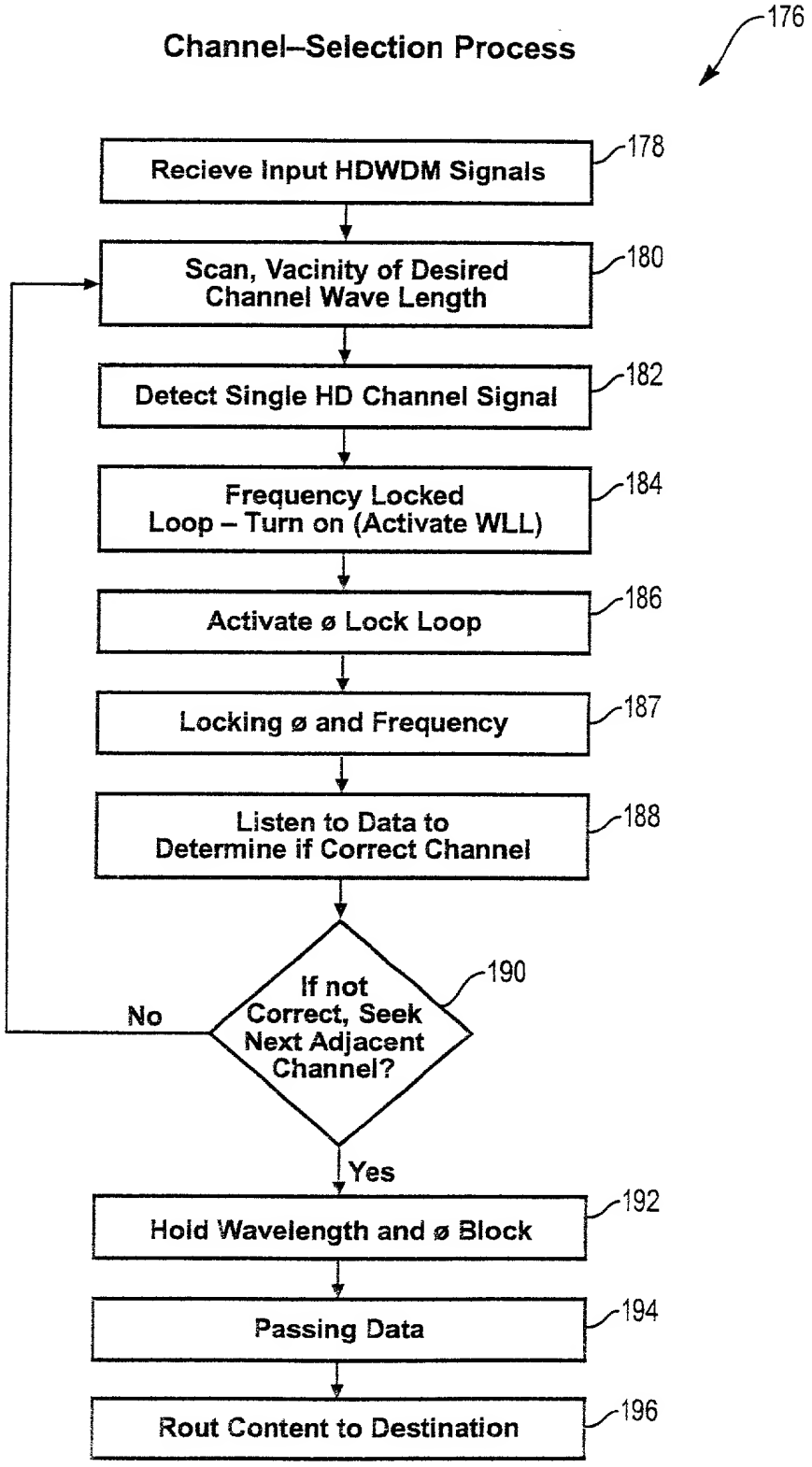
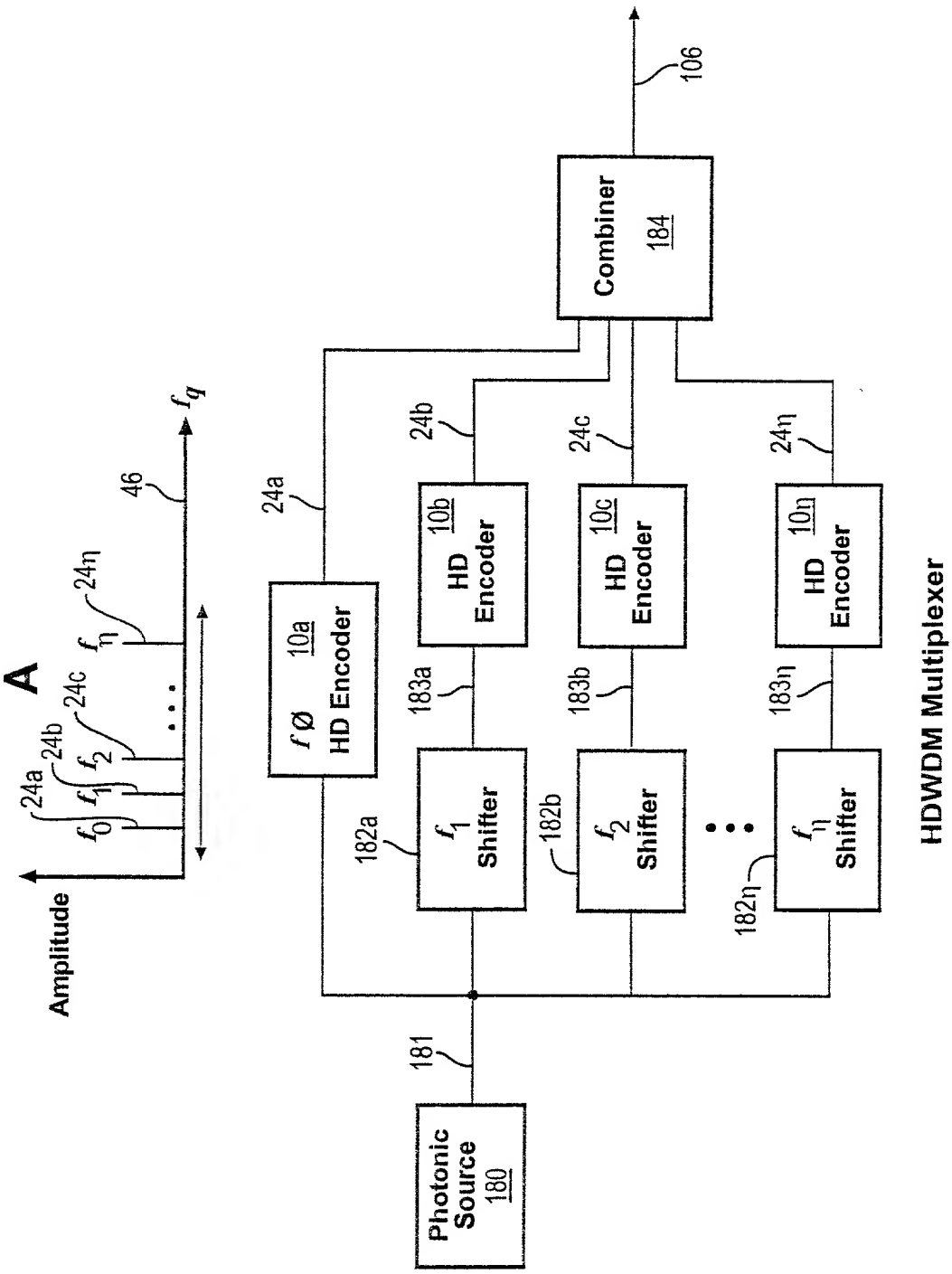
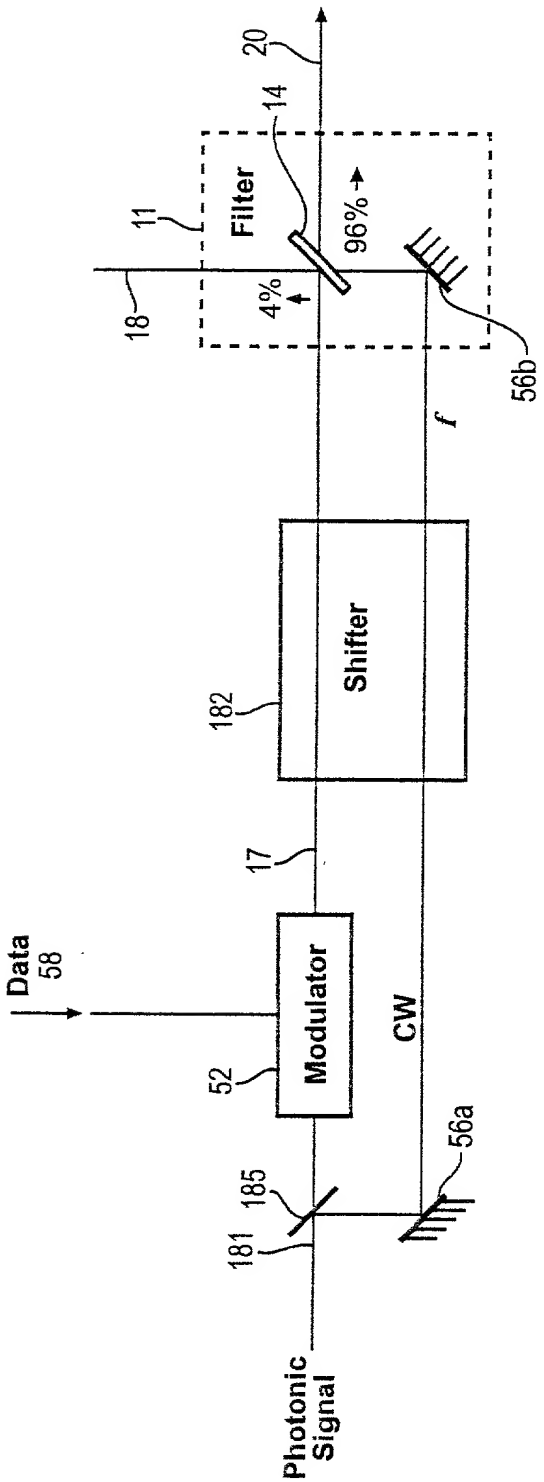

Channel–Selection Process
176
Recieve Input HDWDM Signals
178
Scan, Vacinity of Desired Channel Wave Length
180
Detect Single HD Channel Signal
182
Frequency Locked Loop – Turn on (Activate WLL)
184
Activate ø Lock Loop
186
Locking ø and Frequency
187
Listen to Data to Determine if Correct Channel
188
If not Correct, Seek Next Adjacent Channel?
190
No
Yes
Hold Wavelength and ø Block
192
Passing Data
194
Rout Content to Destination
196

FIG. 13



HDWDM Multiplexer

FIG. 14



Hyper Dense Frequency Shifted Signals

FIG. 15

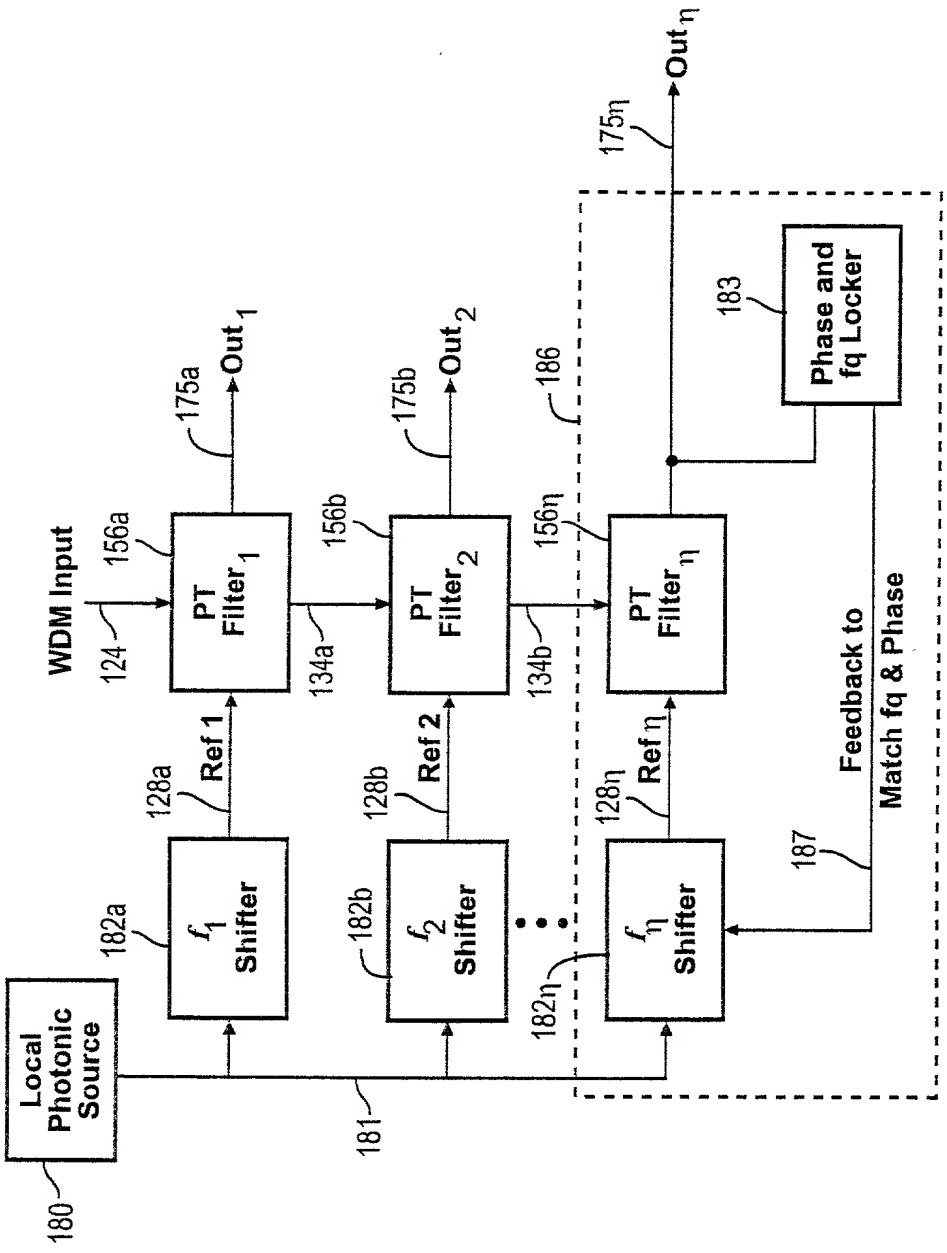
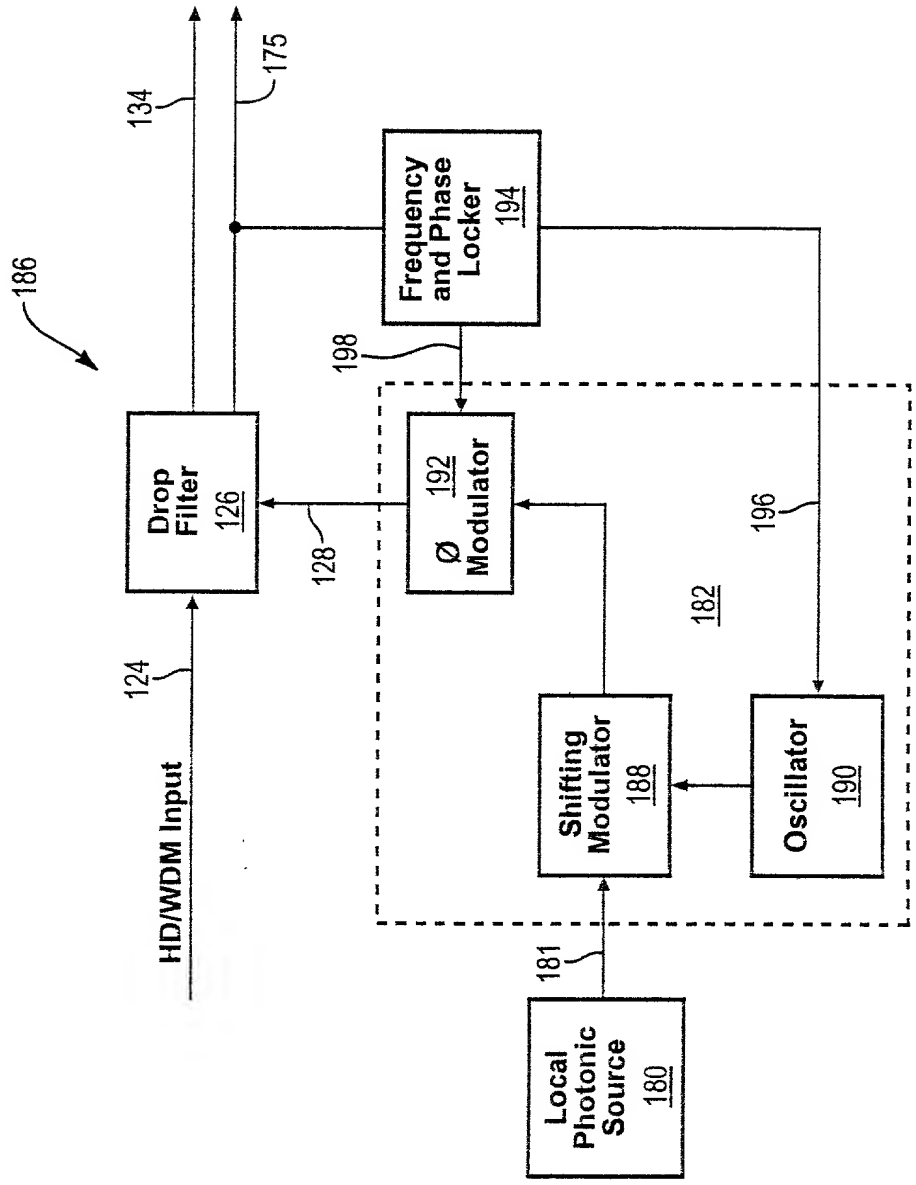
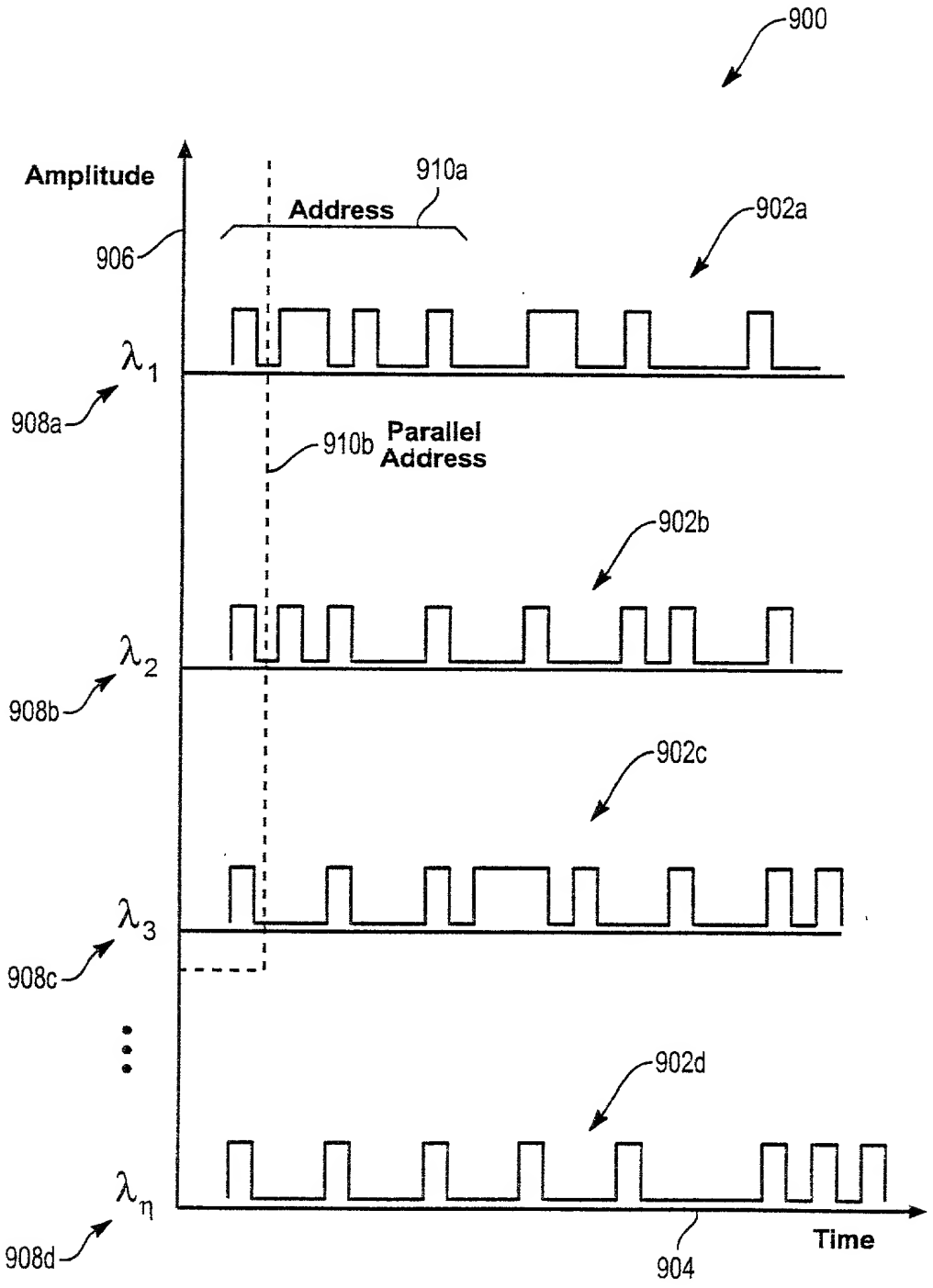

WDM Input
124
156a
PT Filter 1
175a
Out 1
134a
156b
PT Filter 2
175b
Out 2
134b
156η
PT Filter η
175η
Out η
186
WDM Demux With Subscriber Tracking
Local Photonic Source
180
181
182a
f1 Shifter
128a
Ref 1
182b
f2 Shifter
128b
Ref 2
182η
fη Shifter
128η
Ref η
187
Feedback to Match fq & Phase
183
Phase and fq Locker

FIG. 16



Channel Separation Assembly

FIG. 17



Multi–Wavelengths Packet

FIG. 18